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in the *Comptes Rendus*. The composition is found to be wholly different from that of Chinese porcelain, and hence it would appear that the manufacture of true porcelain was known to the ancient Egyptians. The duplication of this Egyptian porcelain would require 40 parts blue glass, 50 parts fine sand, and 5 parts white clay.

LE CHATELIER has also examined statuettes from Egyptian tombs which were supposed by Salvétat to be carved from a natural grit and then glazed with a sodium-calcium-copper silicate. It appears, however, that the statuettes from several different localities consist chiefly of fine grains of quartz sand, with a little clay as a binding material. The glaze is a mixture of sand with a sodium-copper silicate.

THE effect of sulfur, especially as pyrites, in coal when used as a fuel is discussed by Wilhelm Thörner in the *Chemiker-Zeitung*. With such a fuel, not only sulfur dioxide, but also sulfuric acid will be present in the combustion products. Since at least a portion of this sulfuric acid will be deposited upon the boiler walls, tubes, etc., it is necessary that these should be cleaned frequently. The more moisture present, the greater the corrosive action of the acid. If lime is mixed with the coal, the formation or at any rate the deposition of the acid is in large part prevented. The author suggests the use of briquettes made of an intimate mixture of coal with a little lime. With these not only can fine coal screenings, slack, etc., be used, but sulfuric acid corrosion may be practically avoided.

J. L. H.

CURRENT NOTES ON PHYSIOGRAPHY.

IN resuming the preparation of these notes after an interruption of a year and a half, it will not be possible to mention all the physiographic essays published in the interval, but the effort will be made to give account of the more important ones in which the readers of SCIENCE may be interested, as well as to review current publications.

GLACIAL SCULPTURE IN WESTERN NEW YORK.

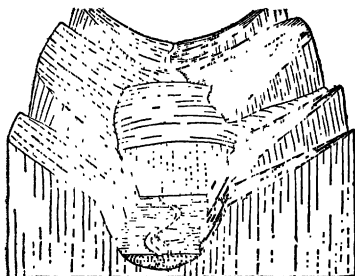
GILBERT concludes that the Niagara limestone upland in western New York is chiefly a

product of pre-glacial erosion, but that its relief has been increased by the greater glacial erosion of the lowland underlain by weaker shales on the north, and that its northward-facing escarpment has been modified in detail by glacial action. Where the escarpment faces northwesterly, so that the ice sheet moved about parallel to its front, the outline has been smoothed; where it faces northeasterly, against the ice motion, preglacial irregularities are intensified by glacial scouring. The plain of Medina shale bordering Lake Ontario, and now overspread with drift and lacustrine strata, has a broadly furrowed rock floor, with troughs parallel to the ice motion: here the minimum estimate of the general reduction of the surface by glacial erosion is set at 40 or 50 feet, 10 or 20 times its measure on the limestone upland (*Bull. Geol. Soc. Amer.*, X., 1899, 121-130).

GLACIATED VALLEYS.

THE most original physiographic essay presented to the recent International Geographical Congress at Berlin was one by Penck on the over-deepened valleys of the Alps. Not only where large lakes occur near the margin of the mountains, but far inward along the larger rivers, the main valley floors are deepened below the level of the side valley floors and the discordance thus indicated is ascribed to the stronger glacial erosion in the main than in the side valleys. The side streams plunge down into the main valley as waterfalls. This discordance of valley floors at first seems exceptional, characterizing valleys of glacial erosion but not of river erosion: but it was well shown that there is no such failure of analogy. A river of water moves nimbly; its cross section is small and its channel is a small part of its valley; the river bed is usually hidden, and hence, as main and side streams have the same surface level at their junction, we do not ordinarily notice that the bed of the main river channel is deeper than that of a side stream, although this relation must be recognized as soon as attention is turned towards it. A river of ice moves slowly; its cross section is large and its channel is a large part of its valley; ancient glacial channels are now habitually laid bare, and the discordance between the beds of

the main and the tributary channels becomes very striking, while we lose sight of the accordance that must have prevailed in the confluent



surfaces of the main glacier and its tributaries. The river channel as well as the glacial channel is U-shaped, but the abandoned glacial channel is so large that it often gives name to the valley in whose bottom it is eroded. The accompanying diagram roughly presents the form of an Alpine valley in preglacial (background), glacial (middleground), and postglacial (foreground) time.

THE heavy glaciation of valleys eroded in the massive gabbros of Skye has produced the following features, as noted by Harker (Geol. Mag., London, 1899, 196-'99). The cross-section of the valleys is U-shaped, especially in their upper part. The head of the valley expands in a corrie (cirque or amphitheatre) whose floor is often a rock-basin holding a tarn. In longitudinal profile, the floor of a valley often consists of two or three stretches of relatively gentle slope (or even of basin-form) separated by relatively sudden descents. Tributary valleys mouth at a considerably higher level than the floor of the main valley. McGee's paper on 'Glacial Cañons' (*Journ. Geol.*, II., 1894, 350-364), referred to by Harker, may be read to advantage in this connection.

It is noteworthy that the discordance of side and main valleys, emphasized by Penck as a characteristic of glacial action, and clearly recognized by McGee and Harker, has been mentioned in but few essays on glacial erosion; yet it can hardly be doubted that such discordance is one of the most striking features of strongly glaciated mountain regions.

ANCIENT VALLEYS OF NORTHEASTERN GERMANY.

THE origin of many broad valleys in north-eastern Germany, as determined by ancient rivers flowing westward, marginal to the retreating ice-sheet of the last glacial period, has lately been restated by Keilhac (*Verh. Gesellsch. Erdk.*, Berlin, XXVI., 1899, 129-139, map), with fuller detail than was given in the earlier explanations by Berendt and Girard. Five important valley courses are traced, exterior to five morainic belts; the southernmost connects the Oder at Breslau with the Elbe above Magdeburg; the northernmost led the Oder from Stettin northwest to Ribnitz and south again from Lübeck to the Elbe at Lauenburg. Lakes are indicated by horizontal shore-terraces at certain depressed areas along the valley courses, where the present northward discharge was ice-barred. The ancient ice-margin valleys owe their considerable breadth to the large volume of the rivers that were then supplied by melting ice on the north as well as by rainfall on the south. The rivers of to-day follow the ancient marginal valleys for moderate distances only, and then turn northward through depressions that were opened to them as the ice melted back; sometimes again turning westward for a stretch along the next marginal valley that is encountered. Thus sub-rectangular bends to the right and the left are systematically repeated seven times by the Oder, between Breslau and Stettin.

W. M. DAVIS.

ZOOLOGICAL NOTES.

MR. C. W. ANDREWS, in a recently issued part (Vol. XV., part 3), of the Transactions of the Zoological Society of London, describes at length and figures the skull and portions of the skeleton of *Phororhacos inflatus*, one of the gigantic extinct Patagonian birds. In discussing the relationship of the genus, which is put among the *Gruiformes*, Mr. Andrews shows a decided leaning toward *Cariama*, saying that the relations of the one toward the other are much the same as those of the extinct *Glyptodon* and *Panocthus* towards existing armadillos. Mr. Andrews will be glad to know that among the material obtained for Princeton University by